

FORM PTO-1390  
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

625-9937

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

**09/937659**

INTERNATIONAL APPLICATION NO.

PCT/SE00/00547

INTERNATIONAL FILING DATE

22 March

PRIORITY DATE CLAIMED

1 April 1999

TITLE OF INVENTION PROCESS FOR COOLING SOLID AND GASEOUS MATERIAL DURING  
GASIFICATION OF SPENT LIQUOR

APPLICANT(S) FOR DO/EO/US

Nilsson, Bengt

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☐ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11 to 20 below concern document(s) or information included:**

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment. To be considered prior to calculation of claims fees.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:

Applicant claims small entity status.

Copies of documents cited in 1449 Form

International Search Report

International Preliminary Examination Report

U.S. APPLICATION NO. **09/937659**INTERNATIONAL APPLICATION NO.  
PCT/SE00/00547ATTORNEY'S DOCKET NUMBER  
625-993721 ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO. .... **\$1000.00**International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO ..... **\$860.00**International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... **\$710.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO  
but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... **\$690.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO  
and all claims satisfied provisions of PCT Article 33(1)-(4) ..... **\$100.00****ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

\$ 1000

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30  
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$ 130

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	10 - 20 =	0	x \$18.00
Independent claims	1 - 3 =	0	x \$80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00
<b>TOTAL OF ABOVE CALCULATIONS =</b>			\$1130
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			+ \$ -565
<b>SUBTOTAL =</b>			\$ 565
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$
<b>TOTAL NATIONAL FEE =</b>			\$ 565
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +			\$
<b>TOTAL FEES ENCLOSED =</b>			\$ 565
			Amount to be refunded: \$
			charged: \$

\$

\$

\$

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\$1130

\$ -565

\$ 565

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\$ 565

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\$

a. ☒ A check in the amount of \$ 565 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0687. A duplicate copy of this sheet is enclosed. Order No. 62625d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO.

Customer No. 20736

SIGNATURE

Jeffrey S. Melcher

NAME

35,950

REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT Application of  
Nilsson,

Group Art Unit: Unknown

U.S. National Phase of  
PCT/SE00/00547

Examiner: Unknown

Filed: September 28, 2001

Att. Docket No.: 625-9937

For: **PROCESS FOR COOLING SOLID AND GASEOUS MATERIAL DURING  
GASIFICATION OF SPENT LIQUOR**

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September 28, 2001

PRELIMINARY AMENDMENT TO BE ENTERED BEFORE CALCULATION OF  
CLAIMS FEES AND CONSIDERED PART OF THE ORIGINAL FILING AND  
EXPLANATION OF AMENDMENT

Hon. Asst. Commissioner of Patents  
and Trademarks  
Washington, D.C. 20231

Sir:

Please preliminarily amend the subject application as follows:

IN THE CLAIMS:

Please amend claims 4-8 as follows:

4. (Amended) Process according to claim 1, characterized in that the said cooling medium (9) is recovered in the said chemical pulping process or in the process for recovery of chemicals and energy from the spent liquor.
5. (Amended) Process according to claim 1, characterized in that contact between the said flammable gaseous material and the said product liquid is avoided.
6. (Amended) Process according to claim 1, characterized in that the said cooling medium (9) is sprayed into the mixture of solid and/or fused material and flammable gaseous material produced by the gasification, preferably in connection with the separation of these two phases (8,25) from each other.
7. (Amended) Process according to claim 1, characterized in that the cooling with the said essentially water-free cooling medium (9) is carried out as a first stage in connection with the separation of the material phases produced by gasification from each other, whereafter further cooling is carried out in a second stage with a second cooling medium (10), which second cooling medium consists essentially of water.
8. (Amended) Process according to claim 1, characterized in that the separation in the separation section forms a part of the total reaction vessel, in which reaction

vessel an essentially even temperature is maintained, which temperature corresponds to the gasification temperature.

Explanation of Amendment:

The claims have been amended as shown by [deletions] and insertions.

4. (Amended) Process according [to any one of the above claims] to claim 1, characterized in that the said cooling medium (9) is recovered in the said chemical pulping process or in the process for recovery of chemicals and energy from the spent liquor.
5. (Amended) Process according [to any one of the above claims] to claim 1, characterized in that contact between the said flammable gaseous material and the said product liquid is avoided.
6. (Amended) Process according [to any one of the above claims] to claim 1, characterized in that the said cooling medium (9) is sprayed into the mixture of solid and/or fused material and flammable gaseous material produced by the gasification, preferably in connection with the separation of these two phases (8,25) from each other.
7. (Amended) Process according [to any one of the above claims] to claim 1, characterized in that the cooling with the said essentially water-free cooling medium (9) is carried out as a first stage in connection with the separation of the material phases produced by gasification from each other, whereafter further cooling is carried out in a second stage with a second cooling medium (10), which second cooling medium consists essentially of water.
8. (Amended) Process according [to any one of the above claims] to claim 1, characterized in that the separation in the separation section forms a part of the total reaction vessel, in which reaction vessel an essentially even temperature is maintained, which temperature corresponds to the gasification temperature.

**REMARKS**

Consideration and allowance of the subject application are respectfully requested.

Claims 1-10 are pending in the application.

The claims have been amended merely to remove multiple dependencies.

Early and favorable action on the merits are respectfully requested.

Respectfully submitted,

Manelli Denison & Selter, PLLC

By

  
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## PROCESS FOR COOLING SOLID AND GASEOUS MATERIAL DURING GASIFICATION OF SPENT LIQUOR

## TECHNICAL FIELD

5       The present invention concerns a process for the recovery of chemicals and energy from the spent liquor obtained in the chemical pulping process, in which the spent liquor is gasified under sub-stoichiometric conditions to produce partly one phase of solid and/or  
10   fused material and partly one phase of a flammable gaseous material, whereafter the said phases are cooled by direct contact with a cooling medium, and the solid and/or fused material is/are separated from the said flammable gaseous phase to be dissolved and collected  
15   as a product liquid in a product liquid receiver.

## STATE OF THE ART

For a very long time the commercially dominating process conventionally used for the recovery of energy and chemicals from the so-called black liquor, which is  
20   obtained in the production of paper pulp according to the sulphate method, has been the so-called Tomlinson process which uses a so-called soda furnace.

A more modern process is described in Swedish  
25   patent SE-C-448 173, which process is based on the sub-stoichiometric gasification/pyrolysis (i.e. a deficiency of oxygen) of the black liquor in a reactor. The resulting products are one phase consisting of solid and/or fused material, chiefly containing sodium  
30   carbonate, sodium hydroxide and sodium sulphide plus a high calorific value flammable gaseous phase, chiefly containing carbon monoxide, carbon dioxide, methane, hydrogen gas and hydrogen sulphide. The mixture of the solid/fused phase and the gaseous phase is cooled and  
35   separated by direct contact with green liquor in a separating unit connected to the reactor, the solid/fused phase being dissolved in the green liquor. The green liquor is then led to a conventional causticizing step for the production of white liquor.

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The gaseous phase is used as fuel for the generation of steam and/or electrical power.

WO95/35410 and WO96/14468 disclose examples of further development of the process described in SE-C-448 173. In these two patent applications the problem, among others, concerning the ability to minimize the content of bicarbonate and carbonate in the liquor produced is dealt with, the resolutions include the minimization of contact between the gaseous phase and the liquor formed in the gasification, as well as the recycling of hydrogen sulphide back to the reactor thereby shifting the reaction equilibrium therein.

It is now evident that further measures can be needed in certain cases to avoid a bicarbonate content and to minimize the carbonate content of the green liquor produced as a consequence of the absorption of carbon dioxide from the flue gas into the liquor produced. In WO95/35410 it is disclosed for example that a small part of the green liquor is used to wet the inside of the separating section between the reactor and the product liquid receiver. This small quantity of green liquor has been shown to lead to undesirable absorption of carbon dioxide in the green liquor, with resulting production of bicarbonate and increased carbonate content.

It is also evident that the water which is sprayed in dissolves the condensed drops of fused material to form a water-fused material solution, in which the hot solution is soon carbonated by carbon dioxide contained in the flue gas. This suggests that water ought to be avoided in the hot transfer zones where the carbon dioxide content of the flue gas can lead to carbonate formation.

### DESCRIPTION OF THE INVENTION

The present invention has the objective of minimizing or eliminating the problems mentioned above, in which a process for the sub-stoichiometric gasification of spent liquor, which leads to reduced

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carbonate formation and eliminates the bicarbonate content of the produced liquor and simultaneously increases the calorific value of the flue gas, is disclosed.

5       The process according to the invention is defined in Patent Claim 1.

      Thus, according to the invention, a cooling medium is provided, which is used in the reactor's outflow of product gases and product fused or solid material,  
10       which is an essentially water-free cooling medium, which cooling medium is at least partly vaporized or cracked.

      The vaporized/cracked cooling medium is thereafter drawn off together with the phase of flammable gaseous  
15       material, and which cooling medium is chosen so that preferably after vaporization/cracking it increases the calorific value of the flammable gaseous material.

      According to one aspect of the invention, the cooling medium provided is a liquified gas, which  
20       preferably is chosen from the group which consists of nitrogen, methane, propane or other hydrocarbons which are in the gaseous state at NTP. NTP is defined as 0°C and 1.013 bar. In order for the gas to be liquified for use in connection with the process according to the  
25       invention, it has been cooled and/or compressed.

      According to another aspect of the invention, the cooling medium consists of at least one essentially organic liquid, which is chosen preferably from the group which consists of turpentine, tall oil, methanol  
30       and other alcohols which are in the liquid state at NTP.

      According to a further aspect of the invention, the cooling medium is recovered in association with the process for the said chemical pulping process or with  
35       the process for the recovery of chemicals and energy from the spent liquor. Thus, the cooling medium is preferably produced internally in the factory starting with the traditional raw materials and products in a



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pulp factory. Turpentine, tall oil and methanol are all by-products of pulping process.

When using the process according to the invention, getting fused material drops going into solution is avoided. Thus, carbon dioxide absorption is prevented/minimized and at the same time the vaporized/cracked cooling medium increases the calorific value of the flue gas.

The cooling media should be chosen according to their capacity to reduce the temperature in the separating section, preferably down to a level where some overheating remains. The remaining cooling down to saturation temperature for the flue gases takes place in the condensate bath and for the fused material fraction in the product liquid receiver.

The ceramic lined upper part of the reactor is connected to a liquid film cooled separating section for fused material/flue gas. Also in this separating section, a large proportion of the reactions takes place, so that the reaction space consists partly of the upper part of the reactor plus the subsequent separating section.

#### DESCRIPTION OF THE FIGURE

The invention is described by means of an embodiment in the following and by reference to Figure 1.

A pressure vessel 1 is shown in Figure 1. On the exterior of the pressure vessel 1 there is an insulation 6 and within the pressure vessel 1 an upper reactor section 2 is arranged which is made of a shell 4 of sheet metal fitted with a ceramic lining 3.

A burner 5 for black liquor is arranged at the top of the reactor part 2 in association with inlets, not shown, for black liquor and oxygen and/or other oxygen containing gas such as air. At the bottom of the reactor section there is an opening 7 by which opening a separating section 8 is connected to the reactor section. Arranged around the separating section 8 there

is a cooling liquid bath 10, henceforth called the condensate bath. In the embodiment shown the condensate bath 10 is located in the same vessel 1 as is the reactor section 2, the separating section 8 and a product liquid receiver 11, henceforth called the green liquor receiver. The green liquor receiver 11 is here located beneath the condensate bath 10, from which it is separated by a horizontal divider 12.

In the embodiment, the essentially water-free cooling medium is sprayed 9, via spray lances or spray nozzles, into a separating section 8 in order to cool the stream of solid and/or fused phase and flue gases flowing out of the reactor. Only one spray lance 9 is shown in Figure 1 but it should be understood that a number of such lances can be arranged round the circumference of the separating section 8. Vaporized/cracked cooling medium leaves the separating section with the flue gas through an exit 20 to be led thereafter to burners and/or gas-driven turbines for electricity generation in the so-called combined heat and power concept.

In the embodiment, the upper part of the separating section 8 is cooled/wetted with condensate from the condensate bath 10, which is used to form a liquid film on the inside of a wall 18 of the separating section 8. The inside of the lower part 25 is cooled/wetted in a corresponding way with a film of green liquor from the green liquor receiver 11.

Other embodiments can be envisaged without the spray lances or nozzles, but with a supply of the essentially water-free cooling medium as a cooling/wetting liquid film in the upper and/or lower parts of the separating section. Yet another variant is, with or without supplementary spray lances or nozzles with essentially water-free cooling medium, to have essentially the water-free cooling medium as cooling/wetting liquid in the upper part of the separating section, while the cooling/wetting liquid in the lower part of the separation section consists of

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the green liquor. Naturally, the essentially water-free cooling medium can be used as the cooling/wetting liquid in both the upper part of the separating section and in the lower part as well as in the spray lances.

- 5 In the case of embodiments with the separation section in only one part, it is possible to envisage, in a corresponding way, introducing the essentially water free liquid via spray lances/nozzles and/or as cooling/wetting liquid on the inside of the separation
- 10 section, or that the inside of the separation section is cooled/wetted with a water-containing liquid, e.g. condensate. Those skilled in the art can easily see how the various liquids can be distributed and used according to the various permutations of the apparatus.
- 15 The invention is not limited to the embodiments presented above, but includes variations within the scope of the following patent claims. The arrangement can e.g. also be used in connection with the sub-stoichiometric gasification of spent liquors other than
- 20 conventional black liquor e.g. sulphite liquor, bleaching liquor or black liquor from a potassium-based process. Furthermore, the green liquor receiver can be replaced with a white liquor receiver, when the process is arranged to avoid causticizing and instead produces
- 25 directly a white liquor with high sulphide, e.g. according to WO91/08337 or EP617 747.

## PATENT CLAIMS

1. Process for the recovery of chemicals and energy from the spent liquor obtained in the chemical pulping process, in which the spent liquor is gasified under sub-stoichiometric conditions to produce partly at least one phase of solid and/or fused material and partly at least one phase of a flammable gaseous material, whereafter the said phases are cooled by direct contact with a cooling medium (9), whereafter the phase of solid and/or fused material is/are separated from the said phases of flammable gaseous material in order to be dissolved and collected as a product liquid in a product liquid receiver (11),  
c h a r a c t e r i z e d i n that the said cooling medium (9) consists of an essentially water-free cooling medium, which cooling medium is at least partly vaporized or cracked, whereby the vaporized/cracked cooling medium is drawn off (20) together with the said phase of flammable gaseous material, plus that the cooling medium (9) after vaporizing/cracking increases the calorific value of the flammable gaseous material relative to the calorific value of the flammable gaseous material without addition of the essentially water-free cooling medium.

2. Process according to Claim 1,  
c h a r a c t e r i z e d i n that the said cooling medium (9) consists of a liquified gas, which preferably is chosen from the group which consists of nitrogen, methane, propane and other hydrocarbons which are gaseous at NTP.

3. Process according to Claim 1,  
c h a r a c t e r i z e d i n that the said cooling medium (9) consists of an organic liquid, which preferably is chosen from the group which consists of turpentine, tall oil, methanol and other alcohols which are liquids at NTP.

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4. Process according to any of the above claims,  
c h a r a c t e r i z e d i n that the said cooling  
medium (9) is recovered in the said chemical pulping  
process or in the process for recovery of chemicals and  
5 energy from the spent liquor.

5. Process according to any of the above claims,  
c h a r a c t e r i z e d i n that contact between the  
said flammable gaseous material and the said product  
10 liquid is avoided.

6. Process according to any of the above claims,  
c h a r a c t e r i z e d i n that the said cooling  
medium (9) is sprayed into the mixture of solid and/or  
15 fused material and flammable gaseous material produced  
by the gasification, preferably in connection with the  
separation of these two phases (8,25) from each other.

7. Process according to any of the above claims,  
20 c h a r a c t e r i z e d i n that the cooling with  
the said essentially water-free cooling medium (9) is  
carried out as a first stage in connection with the  
separation of the material phases produced by  
gasification from each other, whereafter further  
25 cooling is carried out in a second stage with a second  
cooling medium (10), which second cooling medium  
consists essentially of water.

8. Process according to any of the above claims,  
30 c h a r a c t e r i z e d i n that the separation in  
the separation section forms a part of the total  
reaction vessel, in which reaction vessel an  
essentially even temperature is maintained, which  
temperature corresponds to the gasification  
35 temperature.

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9. Process according to Claim 8,  
c h a r a c t e r i z e d i n that an inert gas is  
added immediately above the product liquid receiver  
surface, to form a protecting blanket over the product  
5 liquid receiver by which means carbonation of boiling  
and splashing green liquor from the product liquid  
receiver is prevented.
10. Process according to Claim 9,  
10 c h a r a c t e r i z e d i n that a further cooling  
is carried out by means of the said product liquid  
(11), preferably in the form of a liquid film on a wall  
arranged directly before the solid/fused material  
reaches the product liquid receiver.

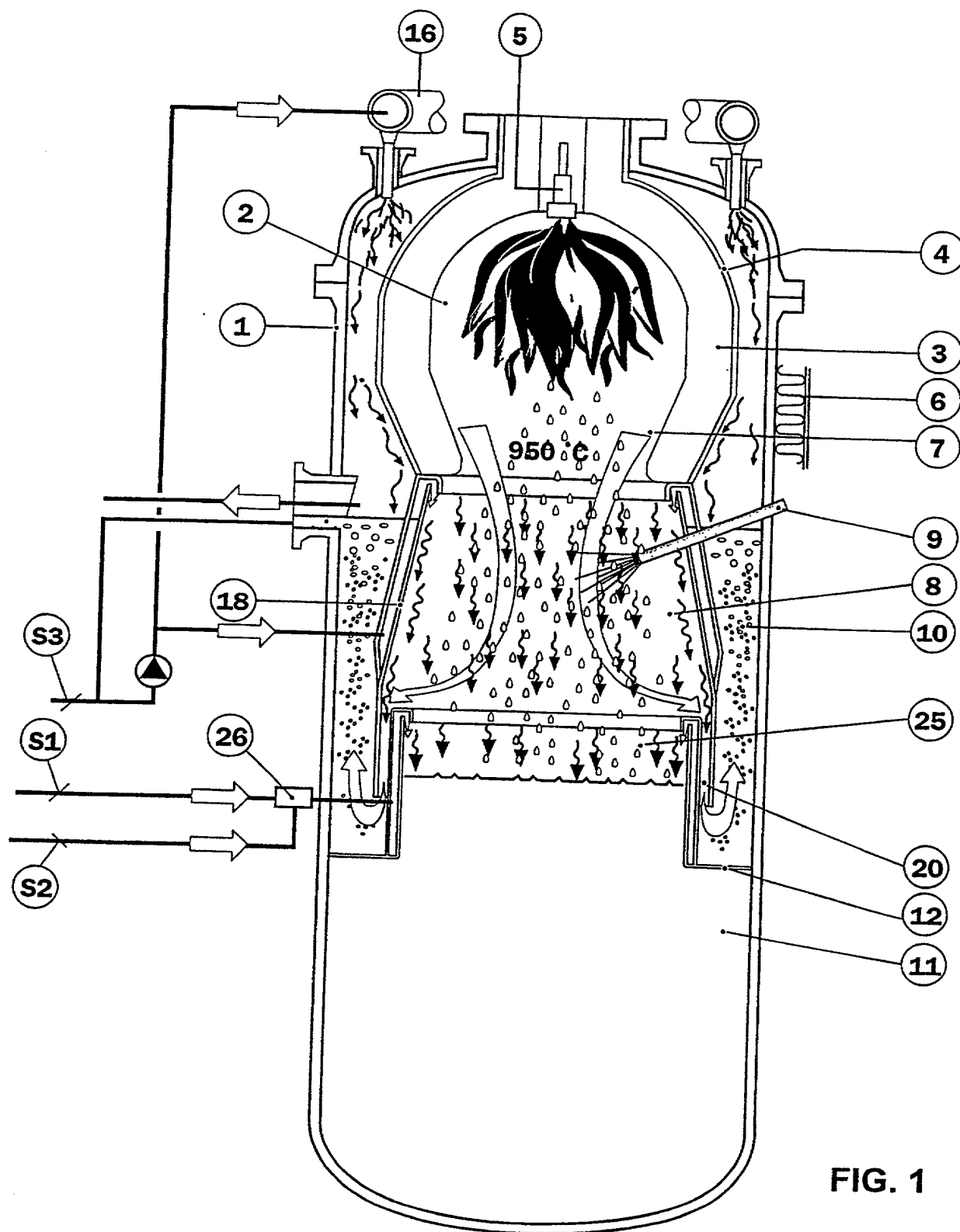


FIG. 1

49107/11 PCT

RULE 63 (37 C.F.R. 1.63)  
**DECLARATION AND POWER OF ATTORNEY FOR UTILITIES OR DESIGN PATENT APPLICATION IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE**

☐ Declaration Submitted with Initial Filing or ☐ Declaration Submitted after Initial Filing (surcharge 37 CFR 1.16 (e) required)  
As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **INVENTION ENTITLED**  
**"PROCESS FOR COOLING SOLID AND GASEOUS MATERIAL DURING GASIFICATION OF SPENT LIQUOR"**, the specification of which is:

☐ attached hereto as Attorney Docket No. 623-P9937, OR  
☐ was filed on (MM/DD/YYYY) \_\_\_\_\_ As United States Application Number (Attorney Docket No. \_\_\_\_\_) or  
U.S. National Phase of PCT International Application No PCT/SE00/00547.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 including for continuation-in-part application, material information which becomes available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a) -(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international Application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			Priority Claimed		Certified Copy Attached	
Number	Country	Foreign Filing Date (MM/DD/YYYY)	Yes	No	Yes	No
SE 9901185-0	SWEDEN	04/01/1999	X			X

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional Application(s) listed below.

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)			Priority Claimed	
Application No. (series code/serial no.)	Filing Date (MM/DD/YYYY)	Status	Yes	No
PCT/SE00/00547	03/22/2000	PENDING	X	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

I hereby appoint the registered practitioners at **Manelli, Denison & Selter, pllc**, represented by **Customer No.: 20736** to prosecute this application and transact all business in the U.S. Patent and Trademark Office in connection therewith. Direct all correspondence to **Customer No.: 20736**.

1. INVENTOR'S SIGNATURE: [Signature] Date 2001 Oct. 03  
Inventor's Name (typed) Bengt Nilsson Sweden  
Residence (City) Skoghall (State) SE-X Family Name Nilsson Country of Citizenship Sweden  
Post Office Address (Include Zip Code) Gränsvägen 21, SE-663 00 Skoghall, Sweden

2. INVENTOR'S SIGNATURE: \_\_\_\_\_ Date \_\_\_\_\_  
Inventor's Name (typed) \_\_\_\_\_  
Residence (City) \_\_\_\_\_ (State) \_\_\_\_\_ Family Name \_\_\_\_\_ Country of Citizenship \_\_\_\_\_  
Post Office Address (Include Zip Code) \_\_\_\_\_

3. INVENTOR'S SIGNATURE: \_\_\_\_\_ Date \_\_\_\_\_  
Inventor's Name (typed) \_\_\_\_\_  
Residence (City) \_\_\_\_\_ (State) \_\_\_\_\_ Family Name \_\_\_\_\_ Country of Citizenship \_\_\_\_\_  
Post Office Address (Include Zip Code) \_\_\_\_\_